



**THE OPERATING SYSTEM
FOR THE CLOUD**

ECE 530 Cloud Computing

OpenStack Services

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Compute: Nova

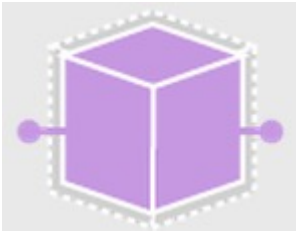
- On-demand networked *virtual machines*
- KVM and Xen are available choices for hypervisor technology or Linux container like Docker

Instances

[+ Launch Instance](#)[Soft Reboot Instances](#)[Terminate Instance](#)

<input type="checkbox"/>	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Uptime	Actions
<input type="checkbox"/>	test1	Ubuntu 14.04 amd64	192.168.1.3	m1.small 2GB RAM 1 VCPU 20.0GB Disk	-	Active	nova	None	Running	0 minutes	Create Snapshot More

Displaying 1 item



Network: Neutron

- allowing users to create their own networks and then attach interfaces to them
- highly configurable due to it's plug-in architecture
- legacy networking: nova-network
 - Simplicity
 - Lack functionality (VPN, load balancing, firewall)



Block Storage: Cinder

- Provides persistent block-level storage devices for use with OpenStack compute instances
- Manages the creation, attaching and detaching of the block devices to servers.

Volumes & Snapshots

Volumes Volume Snapshots

Volumes



<input type="checkbox"/>	Name	Description	Size	Status	Type	Attached To	Availability Zone	Actions
<input type="checkbox"/>	test1		1GB	In-Use	-	Attached to test1 on /dev/vdc	nova	<input type="button" value="Edit Volume"/> <input type="button" value="More"/>

Displaying 1 item



Object Storage: Swift

- It accepts files to upload, modifications to metadata or container creation.
- The swift architecture is very distributed to prevent any single point of failure as well as to scale horizontally

Containers

Containers		+ Create Container	Objects	Filter	Filter	+ Create Pseudo-folder
test	Object Count: 0 Size: 0 bytes Access: Private	View Details More ▾	No items to display.			
Displaying 1 item			Displaying 0 items			

Identity: keystone

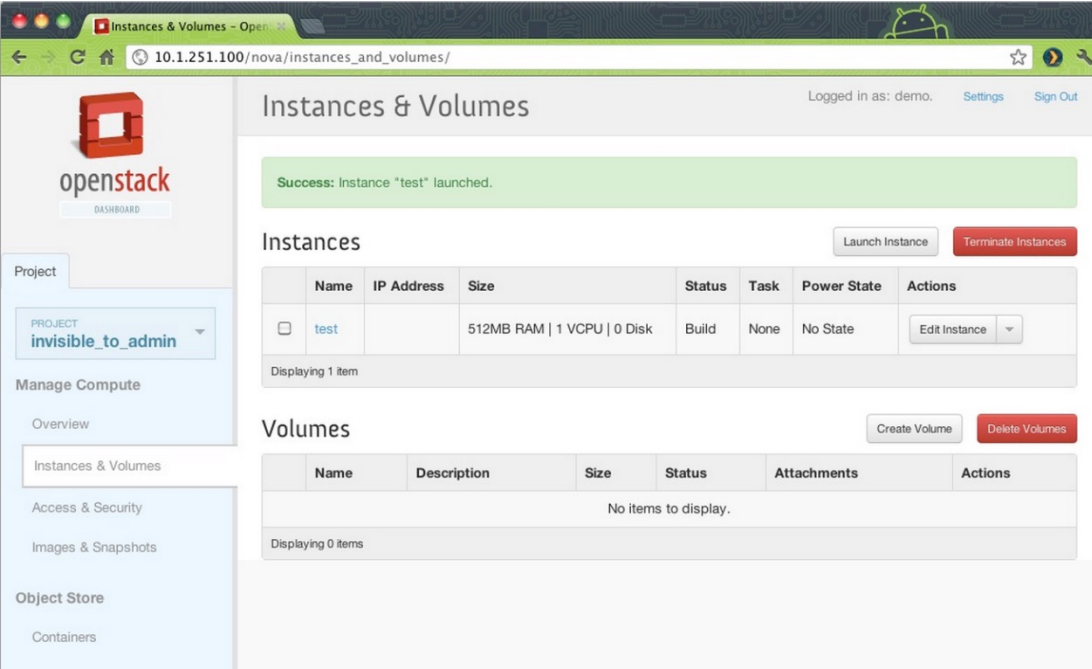
- provides a single point of integration for OpenStack policy, catalog, token and authentication.
- supports multiple forms of authentication including standard username and password credentials, token-based systems and AWS-style
- **User. Tenant. Role.**

Image Store: Glance

- provides discovery, registration, and delivery services for disk and server images.
- It can also be used to store and catalog an unlimited number of backups.

Dashboard: Horizon

- provides administrators and users a graphical interface to access, provision, and automate cloud-based resources.



The screenshot displays the OpenStack Horizon dashboard. The top navigation bar shows the user is logged in as 'demo'. The sidebar on the left contains the OpenStack logo and a 'Project' dropdown menu set to 'invisible_to_admin'. Below the sidebar, the 'Manage Compute' section is active, showing 'Overview', 'Instances & Volumes', 'Access & Security', 'Images & Snapshots', 'Object Store', and 'Containers'.

The main content area is titled 'Instances & Volumes'. It features a green success message: 'Success: Instance "test" launched.' Below this, there are two sections:

Instances

Buttons: Launch Instance, Terminate Instances

	Name	IP Address	Size	Status	Task	Power State	Actions
<input type="checkbox"/>	test		512MB RAM 1 VCPU 0 Disk	Build	None	No State	Edit Instance

Displaying 1 item

Volumes

Buttons: Create Volume, Delete Volumes

Name	Description	Size	Status	Attachments	Actions
No items to display.					

Displaying 0 items

Compare to AWS

- Core Services

Service	OpenStack	AWS
Compute	Nova	EC2
Network	Neutron	VPC
Block Storage	Cinder	EBS
Object Storage	Swift	S3
Image management	Glance	AMI
Dashboard	Horizon	Console
Identity	Keystone	IAM

Homework: Install OpenStack

- Hardware Planning (Multi-node)

Node	Hardware Requirement
Controller	1 core, 1G mem, 10G
Compute	2+ cores, 3G+ mem, 20G
Block Storage	1 core, 1G mem, “cinder-volume” logical volume group

- Network Planning
 - Nova-network: 2 subnets
 - Neutron: 3 subnets

How to troubleshoot

- LOG file
 - Enable verbose output in conf
 - Locate in */var/log/projectcode*
- ask.openstack.org
- Google
- Delete VM and reinstall.
 - Use snapshot (Vmware) to save VM state.